

**FACT SHEET FOR NPDES  
PERMIT NO. WA-005220-5**

**CITY OF GRANDVIEW  
WASTEWATER TREATMENT PLANT**

**SUMMARY**

The City of Grandview is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) permit for its Publicly-Owned Treatment Works (POTW). The City's POTW consists of approximately 28 miles of sewers, 5 lift stations and a wastewater treatment plant. The plant receives a combination of domestic and industrial wastewater from local food processing industries (high BOD and TSS). The combined wastewater receives primary clarification (with lime addition) and treatment in an aerated lagoon. The wastewater stream is then split. A portion of the wastewater receives additional treatment in a series of facultative lagoons and is then applied to spray fields or discharged to non overflow pond systems. The remainder receives treatment in a recently completed secondary treatment facility prior to discharge to the Yakima River. The secondary treatment began discharging in May of 2002.

The existing operations at the spray fields continue to experience water quality problems, salinity impacts in the ground water and high effluent pHs during the summer months. The City has no immediate plans to discontinue use of these sprayfields. However the City feels that through the use of the newly constructed surface water discharge, it will be able to moderate the impacts to ground water by maximizing the discharge of high salinity wastewater to the Yakima River.

The previous permit contained interim and final limits for the sprayfield and limits for a surface water discharge. This permit contains substantially the same discharge conditions, with the addition of a final effluent ammonia limit.

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## **INTRODUCTION**

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Grandview
Facility Name and Address	City of Grandview Wastewater Treatment Plant 850 Bridgeview Road Grandview, WA 98930
Type of Treatment:	Primary Clarification, Aerated Lagoon <sup>a</sup> , Activated Sludge, Anoxic Nitrogen Removal, Ultraviolet Disinfection. Discharge (001)
	Primary Clarification, Aerated Lagoon <sup>a</sup> , Facultative Lagoon, Chlorine Disinfection, land application. Discharge (002, 003 & 004)
Discharge Locations	<u>001</u> Yakima River, River Mile = 55.2 Latitude: 46° 12' 58" N Longitude: 119° 54' 40" W  <u>002</u> Yakima River, River Mile = 53.4 (Lagoon Overflow) Latitude 46° 12' 27" N Longitude: 119° 53' 01" W  <u>003</u> : Land application sprayfield sites Portions of Sections 1,2, and 3 of T8N R23E  <u>004</u> : Land application to non-overflow ponds and game ponds Portions of Sections 1,2, and 3 of T8N R23E
Water Body ID Number	Yakima River: WA-37-1010

<sup>a</sup> All wastewater receives the same treatment through the aerated lagoon, after which the treatment trains diverge.

## **BACKGROUND INFORMATION**

### **DESCRIPTION OF THE FACILITY**

The City of Grandview is located along Interstate-82, approximately 40 miles south east of the City of Yakima. The Grandview Wastewater Treatment Plant (WWTP) is located south of the City, on the south (far) side of the Yakima River.

### **History**

Operations at the current site began in 1967, with lagoon treatment followed by discharge from Lagoon G to the Yakima River. In the late 1970's the method of disposal was changed to land application. The 1978 improvements added the primary clarifier with lime addition for coagulation. Improvements in 1990 added mechanical aeration, and chlorine disinfection prior to discharge to the East Game Ponds. The most recent improvements, completed since the last permit, include: an aerated sludge storage tank, sludge thickening equipment and drying beds, chlorine disinfection improvements, an additional aerated lagoon, improvements at the Euclid Road lift station, and an activated sludge treatment plant that includes UV disinfection and a discharge to the Yakima River.

### **Collection System Status**

The City's collection system includes 147,000 linear feet (28 miles) of pipe, and seven lift stations. The main lift station, located at Euclid Road, includes elements of the treatment process (screening) and pumps all the wastewater to the far side of the Yakima River to the WWTP.

The City's 1997 General Sewer Plan found no infiltration and some inflow, which was determined to be non-significant in the collection system. The General Sewer Plan also identified odor problems in the collection system. The odors appear to be coming from a manhole near Dykstra Park and interfere with residents' use of the park.

The most significant improvement to the collection system was improved pretreatment, particularly in regard to low pH discharges. The City had determined through experience that low pH discharges had resulted in significant increased O&M expense due to failed seals and bearings on the pumps at City owned lift stations. The City currently administers a pretreatment program through user contracts with enforcement through financial surcharges if the discharges exceed the parameters in the contract.

Due to the low level of I/I found in 1997 a single reevaluation of I/I will be required in this permit.

## **Treatment Processes**

The current configuration of the WWTP includes two separate treatment processes with separate outfalls. The processes share the Euclid Road lift station, a primary clarifier, and an aerated lagoon.

Wastewater entering the treatment process receives coarse screening prior to being pumped across the river at the Euclid Road lift station. The wastewater is then settled in the primary clarifier. Lime can be added to the clarifier on a seasonal basis to act as a coagulant and enhance settling. The lime also serves to reduce odors from the settled solids prior to dewatering and drying.

The clarifier effluent flows by gravity into one of two mechanically aerated lagoons (Lagoon A, and Aerated Lagoon No. 1 - "Aqua"). The flow can also be split between the lagoons. Following aeration, the wastewater flows by gravity through a series of additional facultative lagoons (Lagoons B through F). These lagoons are also utilized for winter storage of the wastewater for discharge during the summer. Additional lagoons (High-C Lagoons) are also utilized intermittently for additional winter storage.

Wastewater is then pumped, or flows by gravity at high lagoon levels, to the chlorine contact chamber for disinfection. Disinfected effluent is then pumped to one of several land application discharge sites. The land application sites include spray fields, non-overflow pond systems, and one overflow pond system. The sprayfields are not used to grow a crop. Lagoon G, which is not part of the land application sites or non-overflow pond systems, can discharge (overflow) to the Yakima River. This discharge is intended only to prevent overtopping of the treatment lagoons during winter when the sprayfields cannot operate.

The recently completed activated sludge treatment plant, designed to treat a portion of the total wastewater flow, pumps wastewater from the new aerated lagoon (Aqua) and provides treatment in aerobic and anoxic activated sludge basins. The mixed liquor is settled in two secondary clarifiers and the sludge is recycled, or wasted to control the process. The activated sludge process is designed to remove BOD, TSS, ammonia, and total nitrogen. The effluent is disinfected with ultraviolet light prior to discharge in the Yakima River.

## **Discharge Outfall**

Effluent is discharged from the facility in four locations.

- Via 600 foot long 18-inch ductile iron and HDPE outfall into the Yakima River. (001)
- Overflow from Lagoon G into the Yakima River. (002)
- Onto a collection of land application sprayfield sites (003)
- A collection of non-overflow pond systems, intended for use as wild life habitat (004)



The plant has not discharged at outfall 002, the overflow from the lagoon system at Lagoon G since 1995. Outfall 002 is not intended for continuous discharge, but is instead a safety feature to prevent overtopping, and possibly compromising the structural integrity, of the lagoon dikes.

### **Residual Solids**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, and screenings are drained and disposed of as solid waste at the local landfill. Sludge removed from the clarifiers is stored in an aerated sludge holding tank prior to dewatering in a belt filter press. The dewatered solids are stored in sludge drying beds prior to land application.

Prior to the latest upgrades at the treatment plant, the facility stored the solids generated in unlined lagoons north of the aerated lagoons. The city is working toward removing these stored biosolids and land applying them.

The treatment plant has provisional approval from the department under the state general biosolids permit to land apply the biosolids at Natural Selection Farms, and has also received provisional approval to temporarily (less than 2 years) store biosolids on site prior to amending a landfill cap to reestablish vegetation.

### **Treatment Plant Classification**

In accordance with Chapter 173-230-140 WAC, the City's treatment plant is categorized as a Class 3 facility. This determination is based on the treatment processes utilized at the facility and design flows. The specific criteria used for this classification are the tertiary treatment provided in the mechanical plant (design flow 1.5 MGD) and the aerated lagoon system (Design Flow 3.45 MGD). Evaluated individually, the plants would have classifications of Class 3 and Class 2, respectively. The operation of both plants by a single group of operators does not significantly increase the complexity of the operation; therefore, the combined plant is categorized as a Class 3 facility.

### **Industrial Users**

When the permit application was received, 8 industrial users discharge to the City's collection system. The users listed in the City's NPDES Permit application include:

A.F. Murch Co.	Stimson Lane	Safeway Stores, Inc.	Shonan, USA, Inc.
Snokist Growers	Welch's	Baker Commodities	Grandview Frozen Foods

All of these industrial users process food or agricultural products that contribute high strength wastes to the treatment facility but do not generally contain priority pollutants. Extreme pHs are a common problem from the dischargers.

The City manages a pretreatment program through user contracts with enforcement through financial surcharges, if the discharges exceed the parameters in the contract. As part of this effort, each industrial discharger is required to install a sampling station, and continuously monitor the pH of its discharge. Only City staff has access to these locked sampling stations.

## **PERMIT STATUS**

The previous permit for this facility was issued on June 1, 1997. The previous permit placed effluent limitations for discharge to the sprayfield on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, and Fecal Coliform bacteria.

An application for permit renewal was submitted to the Department on September 12, 2001 and accepted by the Department on December 19, 2001.

The previous permit expired June 1, 2002, and was administratively extended pending issuance of this permit.

## **SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT**

The facility received its last inspection on August 14, 2001.

During the history of the previous permit, the Permittee has not always remained in compliance. During the lifetime of the previous permit two Notice of Violations (NOVs) were issued. These NOVs are briefly summarized as follows:

- **NOV DE00WQCR-985** – This NOV, dated April 17, 2000, was issued in response to a failure of the main sewage force main used for pumping sewage from the City, across the Yakima River, to the treatment plant. Approximately 306,000 gallons of raw sewage were discharged to the river. A steel spool installed with the original force main appeared to have corroded and failed, resulting in the leak. The steel spools were replaced, and the City's current construction standards call for ductile iron spools in similar installations.
- **NOV DE00WQCR-1272** – This NOV, dated June 14, 2000, was issued in response to an unauthorized discharge of 1000 gallons of spray field effluent to the Yakima River. A sprinkler malfunction caused localized flooding, which resulted in the discharge. The City indicated that the sprinkler was replaced, a control dike was constructed to prevent re-occurrence, and that changes were implemented to the spray field maintenance program.

The previous permit contained a discharge limit of 9.0 maximum pH units on the discharge to the land application sites. The treatment plant is consistently out of compliance with this pH limit during the months of June, July, August, and September. The high pH values present in the lagoon effluent are due to high production rates of algae in the summer which consume dissolved carbonate.

The previous permit contained both interim discharge limits and final limits, which were to take effect on January 1, 2000. Through two separate orders (DE99WQCR-65 and DE01WQCR-3656) the Department extended the interim limits through the end of the permit. The permittee was never out of compliance with the interim discharge limitations (except pH as noted above). The permittee was not able to comply with the final limits for sprayfield discharge in the current permit, also due to high production rates of algae in the summer months.

The permit also included final limits for discharge to the Yakima River through the outfall of the mechanical treatment plant, however that plant had not begun discharging when the permit application was received, and no compliance data were available for discharge at this outfall at that time.

Historically, this facility did not meet ground water quality standards, as measured in the ground water monitoring wells in the sprayfield (Ch 173-200WAC). Order DE93WQ-C406 was issued July 14, 1993. Sections 5 and 6 of that order required the City to prepare a hydrogeological study of the sprayfield and a monitoring plan for the monitoring wells in the sprayfield. Those conditions were met and the documents approved by the department.

Ground water quality monitoring was conducted quarterly during the last permit. The results of that monitoring indicate that ground water beneath the sprayfield still does not meet ground water quality standards. Examination of the ground water quality monitoring data collected during the last permit indicates that on an average basis, nine of the 11 monitoring wells did not meet the ground water quality criterion of 500 mg/L for Total Dissolved Solids, two wells did not meet the nitrate criterion of 10 mg/L, three wells did not meet the iron criterion of 0.30 mg/L, and four wells did not meet the manganese criterion of 0.50 mg/L. Many wells did not exceed these criteria on an average basis, but had individual measurements that exceeded the criteria.

The previous permit did not include limits in ground water. Likewise, this permit will not include limits in ground water. Substantial changes were made to the treatment process during the last permit, including discharge to the Yakima River of effluent that was previously loaded on the sprayfield. In order to assess the effect of the treatment changes on ground water, the proposed permit requires submittal of an updated ground water monitoring program. The data collected during the proposed permit will be evaluated to determine if the decreased loading to the sprayfield improves the ground water quality. From the existing data, it is not evident whether any of the monitoring wells are upgradient of all potential ground water contaminant sources. As a result, improvement in ground water quality will be assessed in each monitoring

well by comparison with historical data. In the event that this comparison does not show improvements in ground water quality that brings each well into compliance with ground water quality standards, at a minimum, the permittee will be required to drill up gradient wells to assess background water quality for comparison with sprayfield water quality.

## WASTEWATER CHARACTERIZATION

### Conventional Pollutants

#### Influent

The wastewater in Grandview has a strong industrial component, and therefore has a high strength relative to typical domestic sewage (Averaging 1,600 mg/L BOD and 500 mg/L TSS). The industrial dischargers account for an average of 0.9 MGD of the average annual flow of 1.5 MGD. The City's permit application indicates that the current industrial users are A. F. Murch Co., Stimson Lane, Safeway Stores Inc., Shonan USA Inc, Snokist Growers, Welch's, Grandview Frozen Foods, and Baker Commodities Inc.

The influent pH varies widely from day to day, with a recorded range of 3.14 to 10.7. The industrial dischargers are responsible for these large swings in influent pH.

The influent wastewater characteristics are reported in the NPDES application and in discharge monitoring reports. Table 1 contains influent data from the City's DMRs for 2000 and 2001.

**Table 1: Influent Characterization**

	Influent Data (2000-2001)			Design Criteria <sup>a</sup>	
Parameter	Minimum Month	Average Annual	Maximum Month	Average Annual <sup>a</sup>	Maximum Month <sup>a</sup>
Flow (MGD)	1.1	1.5	2.7	3.25	4.95
BOD (lbs/day)	9,943	21,308	58,912	37,000	86,000
TSS (lbs/day)	3,612	6,747	16,731	14,310	30,000
Ammonia <sup>b</sup> (lbs/day)	36	100	182	--	--
pH <sup>c</sup>	3.14 <sup>c</sup>	6.12	10.70 <sup>c</sup>		
BOD (mg/L)	891	1,626	3,480		
TSS (mg/L)	375	514	950		
Ammonia (mg/L) <sup>b</sup>	3.8	8.3	17.5		
<sup>a</sup> Design Criteria were obtained from the <i>1997 Wastewater Treatment Facilities Final Engineering Report</i> and the <i>2000 Wastewater Treatment Plant Improvements – Schedule E Plan set</i> .					
<sup>b</sup> Influent ammonia was monitored in the previous permit. This does not provide adequate information on nitrogen removal, therefore influent TKN will be monitored during this permit.					
<sup>c</sup> Maximum and minimum pH readings are single readings not monthly averages.					

## Effluent

The previous permit contained both interim discharge limits and final limits, which were to take effect on January 1, 2000. Through two separate orders (DE99WQCR-65 and DE01WQCR-3656) the Department extended the interim limits through the end of the current permit. Effluent characteristics from the City's DMRs for 2000 and 2001 are compared against both sets of effluent limits in Table 2.

**Table 2: Effluent Characterization - Land Application Discharge  
(Sprayfields and Pond Systems)**

Parameter	Effluent Data			Discharge Limitations <sup>a</sup>	
	Minimum	Average	Maximum	Interim Limits <sup>a</sup>	Final Limits <sup>a</sup>
Flow (MGD) – Monthly Average	0.93	1.5	2.7	--	--
BOD (mg/L) – Weekly Average	16	52	104	300	65
BOD (mg/L) – Monthly Average	10	40	80	200	45
TSS (mg/L) – Weekly Average	14	94	201	300	112
TSS (mg/L) – Monthly Average	13	76	174	200	75
Fecal – Weekly Average	2	62	270	400	200 <sup>b</sup>
Fecal – Monthly Average	2	13	34	200	200 <sup>b</sup>
pH	6.9	8.4	9.8	6.0 to 9.0	6.0 to 9.0
<sup>a</sup> The interim and final discharge limits for the spray fields from the previous permit are shown. The previous permit also contained final effluent limits for the mechanical treatment plant, but the mechanical plant did not begin discharging until May 2002.					
<sup>b</sup> The Final Fecal Coliform limit in the previous permit to the spray fields was a maximum day limit.					

The permit also included final limits for discharge to the Yakima River through the outfall of the mechanical treatment plant and overflow from lagoon G, however that plant had not begun discharging when the permit application was received and no discharge from lagoon G occurred during the last permit, and no compliance data were available for discharge to the river.

## Groundwater

**Table 3. Ground Water Characterization (mg/L)**

Monitoring Well	Total Dissolved Solids (mg/L) <sup>1</sup>	Nitrate-N (mg/L) <sup>1</sup>	Chloride (mg/L) <sup>1</sup>	Iron (mg/L) <sup>1</sup>	Manganese (mg/L) <sup>1</sup>
MW 101	583	11.8	50	0.09	0.004
MW 102	773	2.7	114	0.09	0.43
MW 103	508	1.2	42	0.10	0.005
MW 104	500	3.3	46	0.06	0.006
MW 201	1230	0.14	137	NC <sup>2</sup>	NC
MW 202	992	0.16	69	NC	NC
MW 203	454	1.4	30	NC	NC
MW 301	288	0.24	9.8	0.44	0.60
MW 302	1196	10.8	232	0.50	0.14
MW 303	991	0.05	179	2.24	0.13
MW304	1055	0.57	188	NC	NC
MW 3h	442	1.6	33	0.10	0.01
<sup>1</sup> The values reported represent the average values of the monthly data during the previous permit.					
<sup>2</sup> NC = Not Characterized					

Examination of the ground water quality monitoring data collected during the last permit indicates that on an average basis, nine of the 11 monitoring wells did not meet the ground water quality criterion of 500 mg/L for Total Dissolved Solids, two wells did not meet the nitrate criterion of 10 mg/L, three exceeded the iron criterion of 0.3 mg/L, and four wells exceeded the manganese criterion of 0.05 mg/L. Many wells did not exceed these criteria on an average basis, but had individual measurements that exceeded the criteria.

## Priority Pollutants

No priority pollutant data are available from the new mechanical treatment plant to evaluate. Although Grandview has many industrial discharges, the character of their dischargers indicates that priority pollutants are not likely to be present in the discharge.

However, the extreme pH fluctuations associated with the influent wastewater make it very aggressive toward metals, and it is possible that high metals concentrations are present in the wastewater. Therefore, the permit will require sampling and analysis for priority pollutant metals. The data gathered will be required to be submitted with the application for permit renewal.

### PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

### DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The most recently developed and Department-approved design criteria for this treatment facility are taken from the *1997 Wastewater Treatment Facilities Final Engineering Report* and the *2000 Wastewater Treatment Plant Improvements – Schedule E Plan* set prepared by Huibregtse, Louman Associates, Inc. and are as follows:

**Table 3: Design Criteria for City of Grandview WWTP.**

Parameter	Design Quantity
Maximum Month flow	4.95 MGD
Maximum Month BOD <sub>5</sub> influent loading	86,000 lb./day
Maximum Month TSS influent loading	30,000 lb./day

The design criteria in Table 3 are for the treatment process as a whole, (lagoon system and activated sludge process). The activated sludge treatment process has a separate set of design criteria that apply.

**Table 4: Design Criteria for City of Grandview Mechanical Treatment Plant.**

Parameter	Design Quantity
Maximum Month flow	1.5 MGD
Maximum Month BOD <sub>5</sub> influent loading	11,400 lb./day
Maximum Month TSS influent loading	11,400 lb./day
Ammonia Nitrogen influent loading	1,140 lb./day

## TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

### Surface Water Discharges

The City has recently completed construction on a new biological treatment (secondary/advanced) process that will treat part of the POTW flow and discharge effluent directly into the Yakima River. This permit also authorized discharge to surface waters through the lagoon G overflow. The discharge limits for surface waters developed here also apply to the lagoon G overflow discharge.

At this time the lagoon G overflow is discharged to the river via overland flow with inadequate provisions for mixing and no adequate means of sampling the effluent. This permit will require that the City install an outfall pipe for the overflow discharge from lagoon G that will prevent erosion due to discharge and provide for sampling of the discharge.



The following technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC are:

**Table 5: Technology-based Limits for surface water discharges.**

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Ammonia	Average Monthly Limit = 2.0 mg/L

Because the mechanical treatment plant utilizes UV disinfection, a Chlorine limit does not apply to surface water discharges.

No technology based limit (design criteria) for ammonia is included in the *1997 Wastewater Treatment Facilities Final Engineering Report* and the *2000 Wastewater Treatment Plant Improvements – Schedule E Plan* set. The treatment plant is designed to fully nitrify and denitrify, with an aerobic solids retention time (ASRT) of 20 days. In the absence of explicit design criteria, the nitrification performance of the treatment plant will be evaluated during the next permit cycle to establish performance based limits for the treatment process.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings for BOD and TSS (lbs/day) were calculated as the maximum monthly design flow (1.5 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 375 lb./day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 563 lbs/day.

## **Ground Water Discharges**

The City's existing lagoon treatment system discharges onto a collection of land application sites, including spray fields and non-overflow pond systems.

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

The POTW wastewater stabilization ponds, storage ponds, and spray field percolate have the potential to discharge both water and residual dissolved salts into the local surface aquifer at widely separate locations. The June 1996 City of Grandview *Hydrogeologic Report* stated that: "The treatment, storage, and land application of wastewaters at the City of Grandview wastewater facilities site has and is having an effect on the ground waters beneath the site. Ground water samples collected within the site exhibit elevated levels of chloride, conductivity, manganese, iron, and nitrate, some in excess of ground water quality standards as compared with off-site wells."

The *Design Criteria for Municipal Wastewater Land Treatment Systems for Public Health Protection* prepared by the department of health includes the following pretreatment requirement prior to land application: "The minimum requirement for land treatment systems shall be wastewater equal to or better than effluent from a waste stabilization pond (as defined in WAC 173-221)." The previous permit contained relaxed effluent TSS limits and more stringent fecal coliform limits compared to the waste stabilization pond requirements in WAC 173-221. The previous permit does not document the basis for these variances.

During the current permit cycle, the City of Grandview has requested relaxed limits for pH and further relaxation of the TSS limits to the sprayfield sites. The City made these requests in order to continue sprayfield operation during summer months when large amounts of algae grow in the lagoons, leading to effluent with high pH and TSS. The variances for pH and TSS requested will not result in impacts to ground water quality.

The Department of Health was consulted regarding potential human health impacts of allowing effluent with higher TSS concentrations to be applied to the land application sites. The Department of Health concluded that the higher TSS loading to the sprayfields was appropriate if the increase was mitigated by implementing two improvements at the treatment plant site. 1) a high wind cutoff that shuts down irrigation at a sustained wind speed of 15 MPH; and 2) continuous chlorine residual monitoring that will shut down irrigation pumps if the residual falls below a level required to maintain disinfection. The City has indicated the desire to rely on alarm systems that will direct operations staff to shut down the sprayfield pumps. The department will evaluate the effectiveness of this method of operation and will consider requiring automatic shutdown of these pumps during the next permit. These two improvements are discussed further in the compliance schedule for this permit.

Performance based limits were determined for discharges to the sprayfields. The 95<sup>th</sup> percentile value of the average monthly TSS concentrations in the land applied effluent for 2000 and 2001 is 135 mg/L. 135 mg/L will be used as the maximum monthly discharge limitation. The maximum weekly discharge limitation will be  $135 \text{ mg/L} \times 1.5 = 203 \text{ mg/L}$ .

The Department of Health concluded that a higher concentration of TSS in the discharge to the Non-overflow pond systems was not appropriate. The pond systems (East game ponds, West game pond, and the diked valley) are intended for use as duck habitat. The Department of Health concluded that increased TSS loading to these ponds increased the risks that the ducks could serve as a vector for the transmission of human pathogens to an unacceptable level. This permit will continue to apply the discharge limits contained in the previous permit to discharges to the non-overflow pond systems.

The Department of Health recommended that the City investigate and install treatment processes capable of removing algae and producing an effluent quality comparable to that required by WAC 173-221 for waste stabilization ponds. To this end the City shall prepare a feasibility report that discusses the available options and associated costs for providing algae removal from the lagoon effluent. This requirement is further discussed in the permit's schedule of compliance.

The pH limits included in this permit for the land application systems will be 6 to 10, which is higher than the typical range of 6 to 9. This is due in part to the buffering capacity of the soils on the land application sites, and the fact that the City has established a surface water discharge to reduce ground water impacts. Furthermore, the treatment technology for high pH is neutralization with acid, which will increase the TDS load to the sprayfield.

The following technology-based effluent limits for chlorine, pH, Fecal Coliform Bacteria, BOD<sub>5</sub>, and TSS will be used as the proposed permit's final limits.

**Table 6: Technology-based Limits for ground water discharges.**

<u>Parameter</u>	<u>Limit</u>
pH:	Shall be within the range of 6 to 10 standard units.
Fecal Coliform Bacteria	Maximum Daily Limit = 200 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit = 45 mg/L Average Weekly Limit = 65 mg/L
TSS (pond systems) (concentration)	Average Monthly Limit = 75 mg/L Average Weekly Limit = 112 mg/L
TSS (Sprayfields) (concentration)	Average Monthly Limit = 135 mg/L Average Weekly Limit = 203 mg/L

## **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### **Numerical Criteria for the Protection of Aquatic Life**

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### **Numerical Criteria for the Protection of Human Health**

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish consumption and drinking water from surface waters.

### **Narrative Criteria**

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### **Antidegradation**

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall

constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

### **Critical Conditions**

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

### **Mixing Zones**

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

### **Description of the Receiving Water**

The facility discharges to the Yakima River which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include the Mabton STP located approximately 4 miles upstream, and the Prosser STP located approximately 8 miles downstream. Significant nearby non-point sources of pollutants include several irrigation return drains, including Sulfur Creek (6 miles upstream), which contains effluent from the City of Sunnyside STP. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

This segment of the Yakima River is on the Department's most recent (1998) 303(d) list of water quality-impaired waterbodies for the following parameters: Aldrin, Ammonia-N, DDD, DDE,

DDT, Dieldrin, Endosulfan, Endrin, Fecal Coliform Bacteria, Heptachlor, Heptachlor Epoxide, Instream Flow, Parathion, PCB-1254, PCB-1260, pH, Temperature and Turbidity.

### **Surface Water Quality Criteria**

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	21 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

Class A surface waters normally have a temperature criterion of 18°C. However WAC 173-201A-130(141) establishes a “special” classification of 21°C for this segment of the river, with the following modifier:

Temperature shall not exceed 21°C due to human activities. When natural conditions exceed 21°C no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed  $t=34/(T+9)$ .

### **Consideration of Surface Water Quality-Based Limits for Numeric Criteria**

Pollutant concentrations in the discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the diffusion based model RIVPLUME and maximum size limitations on mixing zones. The RIVPLUME spreadsheets are included in appendix C. Based on bulk diffusion, the dilution factors (acute/chronic) were found to be 18.7 and 59.1. Based on the maximum allowed mixing zone size, the dilution factors were found to be 8.3 and 75. The most stringent (lowest) dilution factor was used in each case.

	Acute	Chronic
Aquatic Life	8.3	59.1
Human Health, Carcinogen		59.1
Human Health, Non-carcinogen		59.1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Yakima River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions were taken from the 1997 Final Engineering Report. The ambient background data used for this permit includes the following:

Parameter	Value used	Source
7Q10 low flow	694.9 cfs	Feb 1997 Engineering Report
Velocity	0.85 ft/sec	Feb 1997 Engineering Report
Depth	5.4 feet	Feb 1997 Engineering Report
Width	152.5 feet	Feb 1997 Engineering Report
Roughness (Manning)	n=0.025	Typical for clean natural channels
Temperature	20.5° C	DOE Water Quality Monitoring Data <sup>1</sup>
pH (high)	8.6	DOE Water Quality Monitoring Data <sup>1</sup>
Dissolved Oxygen	8.4 mg/L	DOE Water Quality Monitoring Data <sup>1</sup>
Total Ammonia-N	0.036 mg/L	DOE Water Quality Monitoring Data <sup>1</sup>
Fecal Coliform	192/100 mL	DOE Water Quality Monitoring Data <sup>1</sup>

<sup>1</sup> Water quality data for the Grandview discharge was obtained by averaging the 95<sup>th</sup> percentile of the monitoring data from 1994-2001 for the Nob Hill Bridge and Kiona water quality monitoring stations.

BOD<sub>5</sub>--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD<sub>5</sub> was placed in the permit.

The impact of BOD on the receiving water was modeled using a Streeter-Phelps analysis, at critical condition and with the technology-based effluent limitation for BOD<sub>5</sub> described under

"Technology-Based Effluent Limitations" above. The calculations used to determine dissolved oxygen impacts are shown in Appendix C.

Temperature and pH--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH was placed in the permit and temperature was not limited.

Fecal coliform--The river segment that the Grandview WWTP discharges into is listed on the Department's 303(d) list of water quality-impaired waterbodies for fecal coliform. Therefore, the water quality standard was adopted as a water quality-based effluent limitation for fecal coliform bacteria and was placed in this permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

Ammonia is the only toxic determined to be present in the discharge. The parameters used in the critical condition modeling are as follows: acute dilution factor 8.3, chronic dilution factor 59.1, receiving water temperature 20.5 °C, receiving water pH 8.6. Water Quality based effluent ammonia limits were determined to be 12.3 mg/L maximum day, and 7.1 mg/L monthly average. Calculations used in developing these water quality based limits are included in appendix C.

### **Whole Effluent Toxicity**

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.



## **Human Health**

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health. Although the Permittee's facility receives industrial discharges, they consist primarily of food processing wastewater. The Department will review all monitoring data required by this permit as it becomes available. In the event the Permittee's discharge is found to violate the State's Water Quality Standards, the Department reserves the right to modify or revoke this permit through an Administrative Order or permit modification.

## **Sediment Quality**

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

## **GROUND WATER QUALITY LIMITATIONS**

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

Although the permittee has implemented improvements to the treatment processes, the Permittee's discharge continues to have the potential to cause a violation of the Ground Water Quality Standards and the Department has imposed the following conditions in this permit:

1. A ground water quality monitoring program shall be included in the proposed permit.
2. The permittee shall operate the combined treatment system (surface discharge and sprayfields) so as to minimize groundwater contamination and maximize the discharge of high salinity wastewaters to the river.
3. Four years from the issuance date of this permit the permittee shall prepare an evaluation of ground water quality.

### COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT

Previous Limits			New Limits		
<b>Surface Water Discharges</b>					
BOD	Monthly Average	30 mg/L	BOD	Monthly Average	30 mg/L
	Weekly Average	45 mg/L		Weekly Average	45 mg/L
TSS	Monthly Average	30 mg/L	TSS	Monthly Average	30 mg/L
	Weekly Average	45 mg/L		Weekly Average	45 mg/L
Fecal Coliform	Month GM.	100/100 ml	Fecal Coliform	Month GM.	100/100 ml
	Weekly GM.	200/100 ml		Weekly GM.	200/100 ml
pH	6.0 to 9.0	Standard units	pH	6.0 to 9.0	Standard units
NH <sub>3</sub>	Daily Max	TBD	NH <sub>3</sub>	Daily Max	12.3 mg/L
				Monthly Average	7.1 mg/L
TRC	Daily Max	TBD; 0.5 mg/L	N/A		
<b>Ground Water Discharges</b>					
BOD	Monthly Average	45 mg/L	BOD	Monthly Average	45 mg/L
	Weekly Average	65 mg/L		Weekly Average	65 mg/L
TSS	Monthly Average	75 mg/L	TSS	Monthly Average	75 mg/L
	Weekly Average	112 mg/L	(Ponds)	Weekly Average	112 mg/L
			TSS	Monthly Average	135 mg/L
			(Sprayfield)	Weekly Average	203 mg/L
Fecal Coliform	Daily Max	200/100 ml	Fecal Coliform	Daily Max	200/100 ml
pH	6.0 to 9.0	Standard units	pH	6.0 to 10.0	Standard units

### MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for activated sludge plants less than 2.0 MGD Design Capacity.

The City measures flow and takes samples in five locations at the wastewater treatment plant. These locations are:

1. Combined Influent – A Parshall flume and refrigerated composite sampler are installed upstream of the primary clarifier. The sampler is proportionally controlled by a flow signal from the Parshall flume.
2. Secondary Plant Influent – A magnetic flow meter is installed on the forcemain in a concrete vault upstream of Distribution box 'A'. A refrigerated composite sampler is located adjacent to Distribution box 'A' with a sample tube is connected directly to the forcemain in the concrete vault. Samples are composited in proportion to the flow measured by the magnetic flow meter.
3. Secondary Plant Effluent – A parshall flume is installed in the UV building for flow measurement, and a refrigerated composite sampler is located next to the flume. Samples are composited in proportion to the flow measured by the Parshall flume.
4. Lagoon Effluent – Lagoon effluent flow is measured using propeller meters installed in each of the tree discharge pipes from the irrigation supply pump station located at the end of the chlorine contact chamber. Flow to the individual sprayfields is measured by propeller meters located elsewhere in the system. Grab samples are obtained from the lagoon effluent pump station wet well (prior to disinfection) or from the sample taps located downstream of the irrigation supply pumps (after disinfection). This sample location is used to monitor both the sprayfield and the game pond discharges.
5. Overflow from Lagoon G – No permanent sampling equipment is installed. In the event of discharge grab samples will be collected and discharge volume will be estimated by the permittee. This permit requires that an outfall structure be constructed and that sampling and flow metering equipment be installed.

WAC 173-220-210(1)(c) authorizes the Department to require "monitoring . . . influent to treatment facilities, . . . and/or receiving waters when determined to be necessary to verify compliance with net discharge limitations or removal requirements, . . . or to determine the effects of the discharge on the surface waters of the State." This permit requires the City to conduct analysis of influent, effluent and the receiving water to provide data verifying compliance with the State's Water Quality Standards.

This permit requires the City to characterize the Yakima River for metals constituents during this permit cycle. Receiving water sampling is being required by the Department because, at this time, reliable ambient data for metals is not available from other sources. The data collected as a result of this characterization study will be used to conduct determinations of the reasonable potential for metals in the Permittee's discharge to exceed the water quality standards. The resulting reasonable potential analyses will be incorporated into the next discharge permit.

Sampling events to develop characterizations of the receiving water, treatment plant influent and effluent, and whole effluent toxicity are required to be carried out concurrently, or as simultaneously as possible. Concurrent sampling will allow as detailed and comprehensive a snapshot as possible of treatment plant removal efficiencies and the effects of the facility's discharge on the Yakima River.

In response to the changes in the treatment system, ground water monitoring will be continued in the proposed permit. The ground water monitoring data from the proposed permit will be evaluated to determine if the changes in the treatment system have mitigated exceedance of the ground water quality standards.

## **LAB ACCREDITATION**

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for BOD/CBOD, TRC, DO, pH, TSS, TDS, Fecal Coliforms. The laboratory is not yet (As of 9/02) accredited for ammonia, however the lab has prepared a procedure and tested their performance evaluation samples.

## **OTHER PERMIT CONDITIONS**

### **REPORTING AND RECORDKEEPING**

The requirements of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### **PREVENTION OF FACILITY OVERLOADING**

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S.4. restricts the amount of flow.

### **OPERATION AND MAINTENANCE (O&M)**

This permit contains Special Condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The sewage treatment plant at the City of Grandview has recently undergone a major upgrade, with surface water discharge in addition to land application of wastewater. This permit will require the permittee to submit an updated O&M manual which will describe the entire treatment process in an integrated fashion. The manual will describe procedures for managing the

treatment system (lagoons and mechanical plant) as an integrated whole. The manual shall contain specific procedures for managing the groundwater contamination issues associated with the lagoon processes, high pH and salt loadings to the spray fields.

The operation and maintenance manual must also contain specific procedures for the operation of the sprayfields to ensure public health protection. The manual must describe the systems used to monitor wind speed and chlorine residual, and the required operator responses if either condition indicates that spraying should not take place. The manual must also describe the seasonal operation of the game ponds to ensure that only adequately treated water is discharged.

### **FEDERAL AND STATE PRETREATMENT PROGRAM REQUIREMENTS**

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) ( 40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)) (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of

industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

## **WASTEWATER PERMIT REQUIRED**

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

## **REQUIREMENTS FOR ROUTINE IDENTIFICATION AND REPORTING OF INDUSTRIAL USERS**

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

## **DUTY TO ENFORCE DISCHARGE PROHIBITIONS**

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

## **SPILL PLAN**

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

This permit requires the Permittee to develop and implement a plan for preventing the accidental release of pollutants to State waters and for minimizing damages if such a spill occurs.

## **SCHEDULE OF COMPLIANCE**

This permit contains several requirements discussed elsewhere in this fact sheet. These requirements are contained in special condition S.12 schedule of compliance. The requirements of the schedule of compliance include:

1. The construction of a flow measurement, sampling and outfall structure for the discharge from the overflow to Lagoon G. The lagoon G overflow (outfall 002) is discharged to the Yakima River via overland flow with inadequate provisions for mixing and no adequate means of measuring the flow rate or sampling the effluent
2. The installation of an on-line chlorine monitor, and wind speed gauges with alarms that will alert plant operations staff. The intent is for these devices to be monitored by plant staff to prevent sprayfield application of inadequately disinfected effluent, or during high winds.
3. A feasibility report evaluating the available technologies for algae removal from the lagoon effluent. The report shall consider providing treatment for the game ponds and all the sprayfield effluent against no treatment. This report shall evaluate the costs, opportunities, and general technical details associated with the various alternatives. The report shall also evaluate the costs required to provide automatic shutdown of the sprayfield pumps if the wind gauge or chlorine residual monitor indicate sprayfield operations should be discontinued.

## **GENERAL CONDITIONS**

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## **PERMIT ISSUANCE PROCEDURES**

### **PERMIT MODIFICATIONS**

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

### **RECOMMENDATION FOR PERMIT ISSUANCE**

This permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

## **REFERENCES FOR TEXT AND APPENDICES**

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.



Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

1996. Implementation guidance for the Ground Water Quality Standards. Pub No. 96-02

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## **APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 16, 2001 in the Yakima Herald Republic to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on July 23, 2003 in the Grandview Herald to inform the public that a draft permit and fact sheet were available for review.

Public notice of modification of draft renewal was published by the City of Grandview on September 10, 2003 in the Grandview Herald to inform the public of modification to the draft permit had been made and that the modified draft permit and fact sheet were available for review.

Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Central Regional Office  
15 West Yakima Avenue, Suite 200  
Yakima, Washington 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted.

The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's permit coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/575-2490, or by writing to the address listed above.

This permit and fact sheet were written by David Dunn.

## APPENDIX B -- GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring**--Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.



## **APPENDIX C -- TECHNICAL CALCULATIONS**

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.wa.gov/ecology>.

Spread of a plume from a point source in a river with boundary effects from the shoreline based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT	
1. Effluent Discharge Rate (cfs):	2.32
2. Receiving Water Characteristics Downstream From Waste Input	
Stream Depth (ft):	5.40
Stream Velocity (fps):	0.85
Channel Width (ft):	152.50
Stream Slope (ft/ft) or Manning roughness "n":	0.025
0 if slope or 1 if Manning "n" in previous cell:	1
3. Discharge Distance From Nearest Shoreline (ft):	71
4. Location of Point of Interest to Estimate Dilution	
Distance Downstream to Point of Interest (ft):	305.4
Distance From Nearest Shoreline (ft):	71
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0
OUTPUT	
1. Source Conservative Mass Input Rate	
Concentration of Conservative Substance (%):	100.00
Source Conservative Mass Input Rate (cfs*%):	232.00
2. Shear Velocity	
Shear Velocity based on slope (ft/sec):	#N/A
Shear Velocity based on Manning "n":	
using Prandtl equations 8-26 and 8-54 assuming	
hydraulic radius equals depth for wide channel	
Darcy-Weisbach friction factor "f":	0.041
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.061
Selected Shear Velocity for next step (ft/sec):	0.061
3. Transverse Mixing Coefficient (ft <sup>2</sup> /sec):	0.198
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)	
C <sub>0</sub>	3.31E-01
x'	3.06E-03
y' <sub>0</sub>	4.66E-01
y' at point of interest	4.66E-01
Solution using superposition equation (Fischer eqn 5.9)	
Term for n= -2	0.00E+00
Term for n= -1	9.96E-143
Term for n= 0	1.00E+00
Term for n= 1	2.77E-41
Term for n= 2	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	305.40
x' Adjusted for <i>Effective Origin</i>	3.06E-03
C/C <sub>0</sub> (dimensionless)	5.10E+00
Concentration at Point of Interest (Fischer Eqn 5.9)	1.69E+00
Unbounded Plume Width at Point of Interest (ft)	47.708
Unbounded Plume half-width (ft)	23.854
Distance from near shore to discharge point (ft)	71.00
Distance from far shore to discharge point (ft)	81.50
Plume width bounded by shoreline (ft)	47.71
Approximate Downstream Distance to Complete Mix (ft):	11,408
Theoretical Dilution Factor at Complete Mix:	301.713
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	94.388
Calculated Dilution Factor at Point of Interest:	59.149

Spread of a plume from a point source in a river with boundary effects from the shoreline based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT	
1. Effluent Discharge Rate (cfs):	2.32
2. Receiving Water Characteristics Downstream From Waste Input	
Stream Depth (ft):	5.40
Stream Velocity (fps):	0.85
Channel Width (ft):	152.50
Stream Slope (ft/ft) or Manning roughness "n":	0.025
0 if slope or 1 if Manning "n" in previous cell:	1
3. Discharge Distance From Nearest Shoreline (ft):	71
4. Location of Point of Interest to Estimate Dilution	
Distance Downstream to Point of Interest (ft):	30.5
Distance From Nearest Shoreline (ft):	71
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0
OUTPUT	
1. Source Conservative Mass Input Rate	
Concentration of Conservative Substance (%):	100.00
Source Conservative Mass Input Rate (cfs*%):	232.00
2. Shear Velocity	
Shear Velocity based on slope (ft/sec):	#N/A
Shear Velocity based on Manning "n":	
using Prandtl equations 8-26 and 8-54 assuming	
hydraulic radius equals depth for wide channel	
Darcy-Weisbach friction factor "f":	0.041
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.061
Selected Shear Velocity for next step (ft/sec):	0.061
3. Transverse Mixing Coefficient (ft <sup>2</sup> /sec):	0.198
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)	
C <sub>0</sub>	3.31E-01
x'	3.05E-04
y' <sub>0</sub>	4.66E-01
y' at point of interest	4.66E-01
Solution using superposition equation (Fischer eqn 5.9)	
Term for n= -2	0.00E+00
Term for n= -1	0.00E+00
Term for n= 0	1.00E+00
Term for n= 1	0.00E+00
Term for n= 2	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	30.50
x' Adjusted for <i>Effective Origin</i>	3.05E-04
C/C <sub>0</sub> (dimensionless)	1.61E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	5.35E+00
Unbounded Plume Width at Point of Interest (ft)	15.077
Unbounded Plume half-width (ft)	7.538
Distance from near shore to discharge point (ft)	71.00
Distance from far shore to discharge point (ft)	81.50
Plume width bounded by shoreline (ft)	15.08
Approximate Downstream Distance to Complete Mix (ft):	11,408
Theoretical Dilution Factor at Complete Mix:	301.713
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	29.828
Calculated Dilution Factor at Point of Interest:	18.692

Streeter-Phelps analysis of critical dissolved oxygen sag.

Based on Lotus File DOSAG2.WK1 Revised 19-Oct-93

INPUT			
1. EFFLUENT CHARACTERISTICS			
Discharge (cfs):			1.5
CBOD5 (mg/L):			30
NBOD (mg/L):			10
Dissolved Oxygen (mg/L):			4
Temperature (deg C):			20.5
2. RECEIVING WATER CHARACTERISTICS			
Upstream Discharge (cfs):			694.9
Upstream CBOD5 (mg/L):			0.5
Upstream NBOD (mg/L):			0.644
Upstream Dissolved Oxygen (mg/L):			8.4
Upstream Temperature (deg C):			20.5
Elevation (ft NGVD):			700
Downstream Average Channel Slope (ft/ft):			0.00018
Downstream Average Channel Depth (ft):			5.4
Downstream Average Channel Velocity (fps):			0.85
3. REAERATION RATE (Base e) AT 20 deg C (day <sup>-1</sup> ):			
			0.95
Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	0.59
O'Connor and Dobbins	.1 - 1.5	2 - 50	0.95
Owens	.1 - 6	1 - 2	0.86
Tsivoglou-Wallace	.1 - 6	.1 - 2	0.63
4. BOD DECAY RATE (Base e) AT 20 deg C (day <sup>-1</sup> ):			
			0.42
Reference			Suggested Value
Wright and McDonnell, 1979			0.42
OUTPUT			
1. INITIAL MIXED RIVER CONDITION			
CBOD5 (mg/L):			0.6
NBOD (mg/L):			0.7
Dissolved Oxygen (mg/L):			8.4
Temperature (deg C):			20.5
2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)			
Reaeration (day <sup>-1</sup> ):			0.96
BOD Decay (day <sup>-1</sup> ):			0.43
3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU			
Initial Mixed CBODU (mg/L):			0.8
Initial Mixed Total BODU (CBODU + NBOD, mg/L):			1.5
4. INITIAL DISSOLVED OXYGEN DEFICIT			
Saturation Dissolved Oxygen (mg/L):			8.779
Initial Deficit (mg/L):			0.39
5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):			
			0.78
6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):			
			10.90
7. CRITICAL DO DEFICIT (mg/L):			
			0.48
8. CRITICAL DO CONCENTRATION (mg/L):			
			8.30

Freshwater un-ionized ammonia criteria based on EPA Gold Book  
(EPA 440/5-86-001) as revised by Heber and Ballentine (1992).

Based on Lotus File NH3FRES2.WK1 Revised 12-Dec-94

INPUT	
1. Temperature (deg C; 0<T<30): 95 percentile ambient	20.5
2. pH (6.5<pH<9.0): 95th percentiel ambient	8.60
3. Total Ammonia (ug N/L):	36.0
4. Acute TCAP (Salmonids present- 20; absent- 25):	20
5. Chronic TCAP (Salmonids present- 15; absent- 20):	15
OUTPUT	
1. Intermediate Calculations:	
Acute FT:	1.0000
Chronic FT:	1.4125
FPH:	1.0000
RATIO:	13.5000
pKa:	9.3851
Fraction Of Total Ammonia Present As Un-ionized:	14.0907%
2. Sample Un-ionized Ammonia Concentration (ug/L as NH3-N):	5.1
3. Un-ionized Ammonia Criteria:	
Acute (1-hour) Un-ionized Ammonia Criterion (ug/L as NH3-N):	213.7
Chronic (4-day) Un-ionized Ammonia Criterion (ug/L as NH3-N):	34.5
4. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (ug/L as NH3-N):	1,517
Chronic Total Ammonia Criterion (ug/L as NH3-N):	245

Water Quality-Based Permit Limits for acute and chronic criteria.  
(based on EPA/505/2-90-001 Box 5-2).

Based on Lotus File WQBP2.WK1 Revised 19-Oct-93

INPUT	
1. Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	1.517
Chronic (n-day) Criteria:	0.245
2. Upstream Receiving Water Concentration	
Upstream Concentration for Acute Condition (7Q10):	0.036
Upstream Concentration for Chronic Condition (7Q10):	0.036
3. Dilution Factors (1/{Effluent Volume Fraction})	
Acute Receiving Water Dilution Factor at 7Q10:	8.300
Chronic Receiving Water Dilution Factor at 7Q10:	59.100
4. Coefficient of Variation for Effluent Concentration (use 0.6 if data are not available):	0.600
5. Number of days (n1) for chronic average (usually four or seven; four is recommended):	4
6. Number of samples (n2) required per month for monitoring:	2
OUTPUT	
1. Z Statistics	
LTA Derivation (99%tile):	2.326
Daily Maximum Permit Limit (99%tile):	2.326
Monthly Average Permit Limit (95%tile):	1.645
2. Calculated Waste Load Allocations (WLA's)	
Acute (one-hour) WLA:	12.328
Chronic (n1-day) WLA:	12.388
3. Derivation of LTAs using April 1990 TSD (Box 5-2 Step 2 & 3)	
Sigma <sup>2</sup> :	0.3075
Sigma <sup>2</sup> -n1:	0.0862
LTA for Acute (1-hour) WLA:	3.958
LTA for Chronic (n1-day) WLA:	6.534
Most Limiting LTA (minimum of acute and chronic):	3.958
4. Derivation of Permit Limits From Limiting LTA (Box 5-2 Step 4)	
Sigma <sup>2</sup> -n2:	0.1655
Daily Maximum Permit Limit:	12.328
Monthly Average Permit Limit:	7.116

## APPENDIX D -- RESPONSE TO COMMENTS

The Department received the following comments from the City of Grandview concerning the requirements of this permit. The Department's responses follow each comment by the City.

### Comment #1

Page 9, Section S1.A.2. Effluent Limitations Outfall #003, Biochemical Oxygen Demand:

The BOD<sub>5</sub> effluent limits for discharges to our sprayfields are listed in the draft permit as 45 mg/l average monthly, and 65 mg/l average weekly. A review of the effluent data for this outfall for the period of February 1998 through June 2002 shows the 95<sup>th</sup> percentile of the BOD<sub>5</sub> values to be 69.6 mg/l. For the 45 months of discharges during this period, the average BOD<sub>5</sub> concentration exceeded 45 mg/l 14 times, so placing the limit at 45 mg/l will significantly reduce our ability to use our sprayfields.

We understand the average monthly value of 45 mg/l is representative of effluent limits for lagoon discharges to surface waters, whereas our effluent discharges are to land. In past discussions with the Department of Ecology, it was recognized the higher lagoon effluent BOD concentrations are due to algae, rather than inadequate treatment. Our low soluble BOD (SBOD) values, and higher TSS values for our lagoon effluent confirm this phenomenon. As recognition of the impacts of algae on our lagoon effluent, TSS effluent limits of 135 mg/l average monthly and 203 mg/l average weekly are included in the permit. We believe a corresponding change in BOD<sub>5</sub> effluent limits is appropriate.

We request the effluent BOD<sub>5</sub> limits for discharges to our sprayfields be set that are representative of our lagoon treatment process and for discharges to land. Based on our treatment process performance and lagoon effluent data, we ask the effluent BOD<sub>5</sub> limits be set at 90 mg/l average monthly, and 135 mg/l average weekly. Alternatively, lagoon effluent limits for SBOD<sub>5</sub> of 30 mg/l average monthly, and 45 mg/l average weekly could also be implemented. By revising the BOD limits in the permit to these values, BOD<sub>5</sub> and TSS limits for discharge to our sprayfields would be consistent for lagoon effluent containing algae, and would represent the level of treatment provided.

### Response:

The Department accepts the analysis provided and has included an SBOD<sub>5</sub> limit for discharges to the sprayfield and removed the previous BOD<sub>5</sub> limit. The SBOD<sub>5</sub> limit is a mass loading limit with units of lbs/acre-day. The limit placed in the permit is 20 lbs/acre-day. This limit is based on protecting ground water and experience with the fruit juice and fruit processing industry. The permit is also modified to provide monitoring

and reporting of the SBOD<sub>5</sub> mass loading to the sprayfields. The Permittee is required to update its sprayfield management plan to include procedures for recordkeeping and the day to day management of the SBOD<sub>5</sub> load to the sprayfields.

## **Comment #2**

Page 13, Section S2.A. Monitoring Schedule, Ground Water Monitoring for Total Coliform:

As written, the permit requires the City to test for Total Coliform in units of #colonies/100mL. Testing is to be done once per quarter on grab samples, and is only required if soluble iron (+2) is detected in the sample per footnote w. Based on historical test results, we often do not find total coliform bacteria in our ground water samples, though soluble iron was detected. Therefore, this testing requirement adds expense and may not provide meaningful results. We request the total coliform testing be further footnoted as follows:

“z – If total coliform testing is required because soluble iron (+2) is detected in the sample, then an absence/presence test shall be performed. If coliform bacteria are found to be present, then the #colonies/100mL shall be determined through further testing.”

Modifying the testing requirements to first include the absence/presence test will continue to provide the desired information on the #colonies/100mL in ground water samples, but will reduce our testing expenses.

## **Response**

The suggested tiered monitoring has been incorporated in the monitoring schedule in section S2 of the permit